

# QoS Perspectives

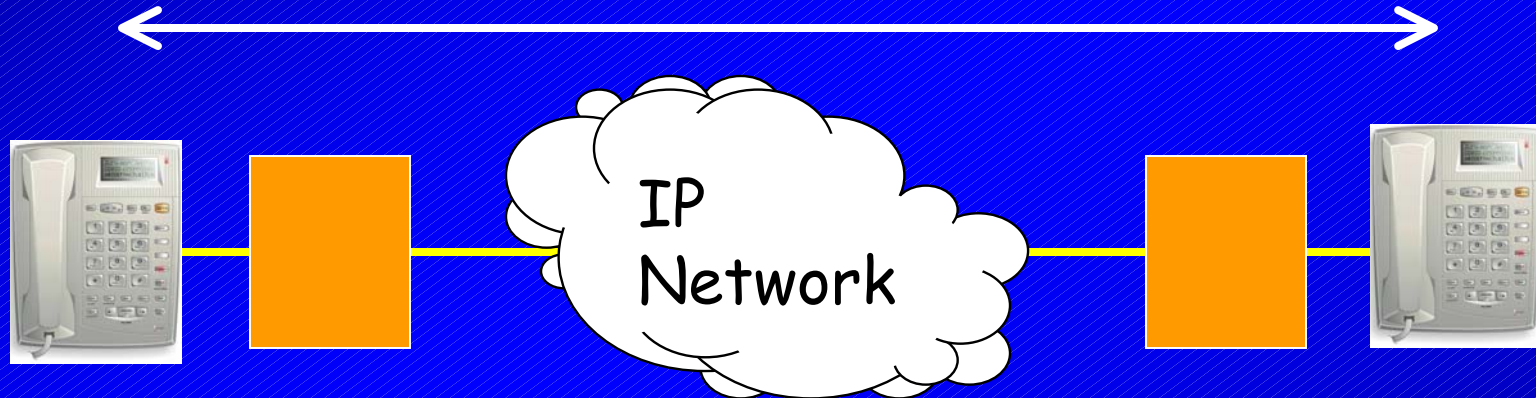
## End User Perceived QoS

Telchemy Incorporated

*Web: [www.telchemy.com](http://www.telchemy.com)*

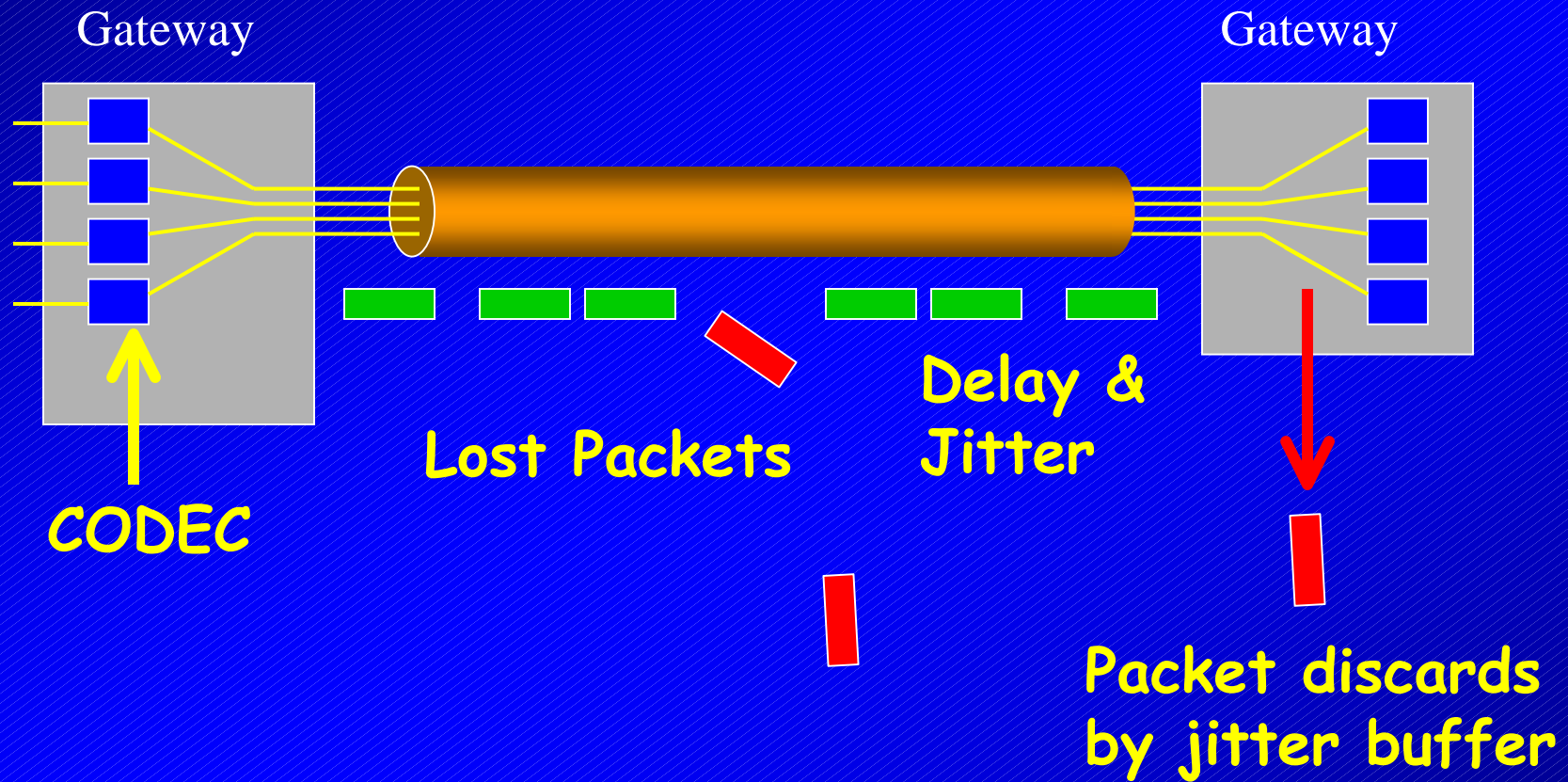
# Our QoS Perspective!!

User Perceived - Quality of Experience

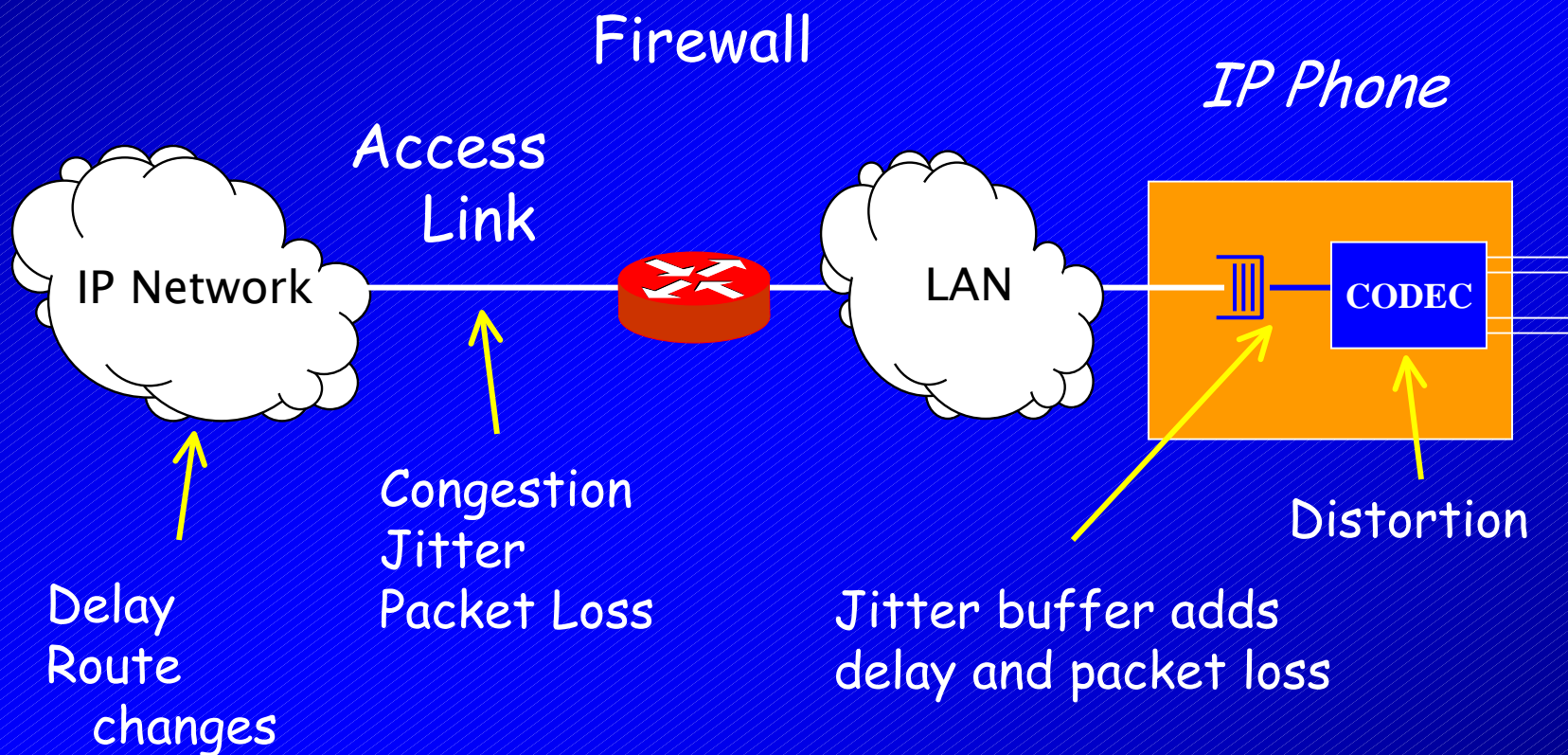


Network - Quality of Service

# Factors impacting quality



# Sources of impairments



# Sources of Impairments

- Access Links are a bottleneck
  - Congestion leads to jitter, delay variations, packet loss
  - Little control over LAN traffic
  - Little control over traffic coming from the IP network
- Core IP networks suffer from route changes/ flapping, stray packets
- .... Leads to BURSTY PACKET LOSS

# Effects of Burstiness

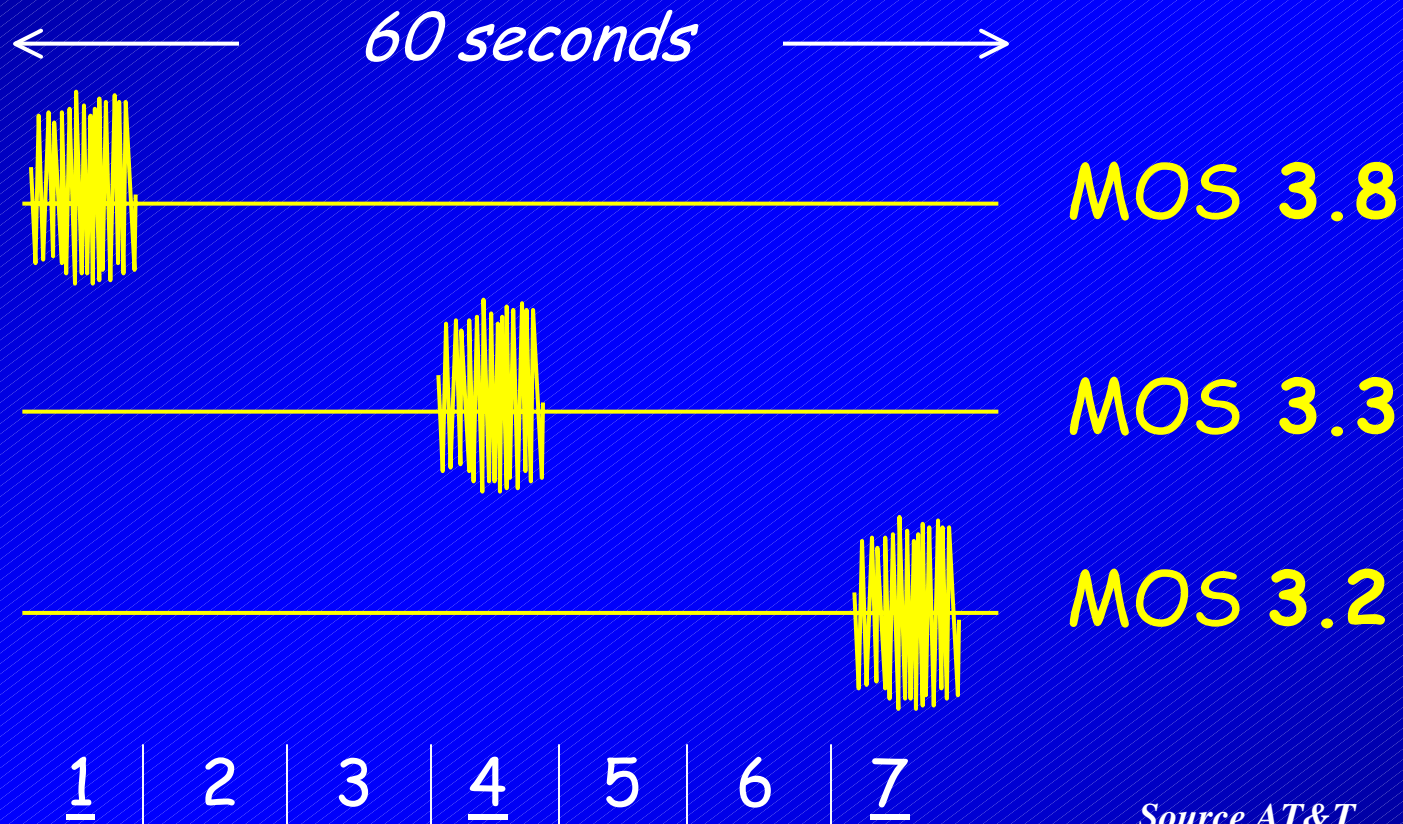


Packet loss concealment is effective for isolated lost packets but can't hide periods of high packet loss

1% random loss may be ok but

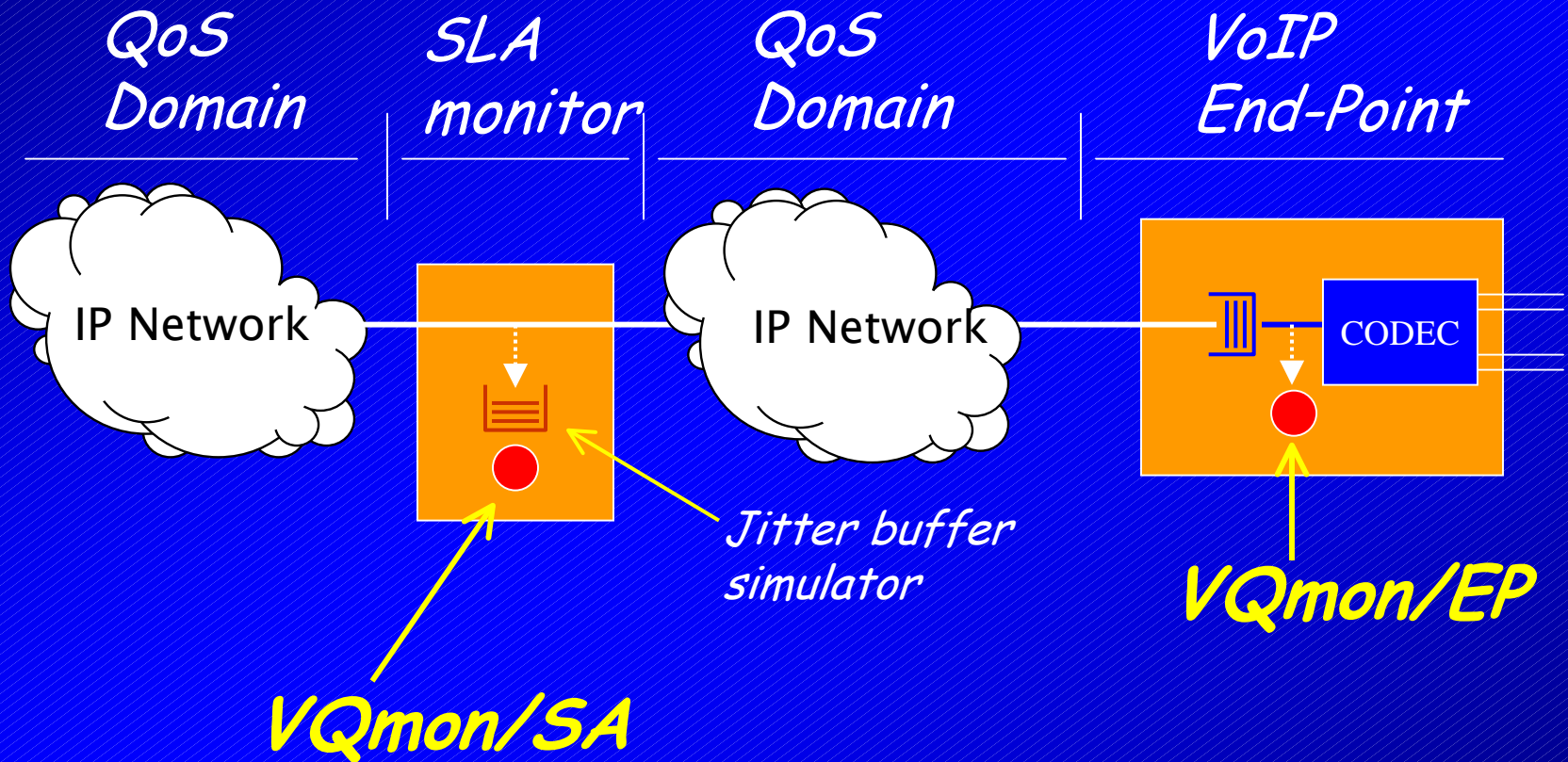
1% bursty loss may not

# "Recency" effect

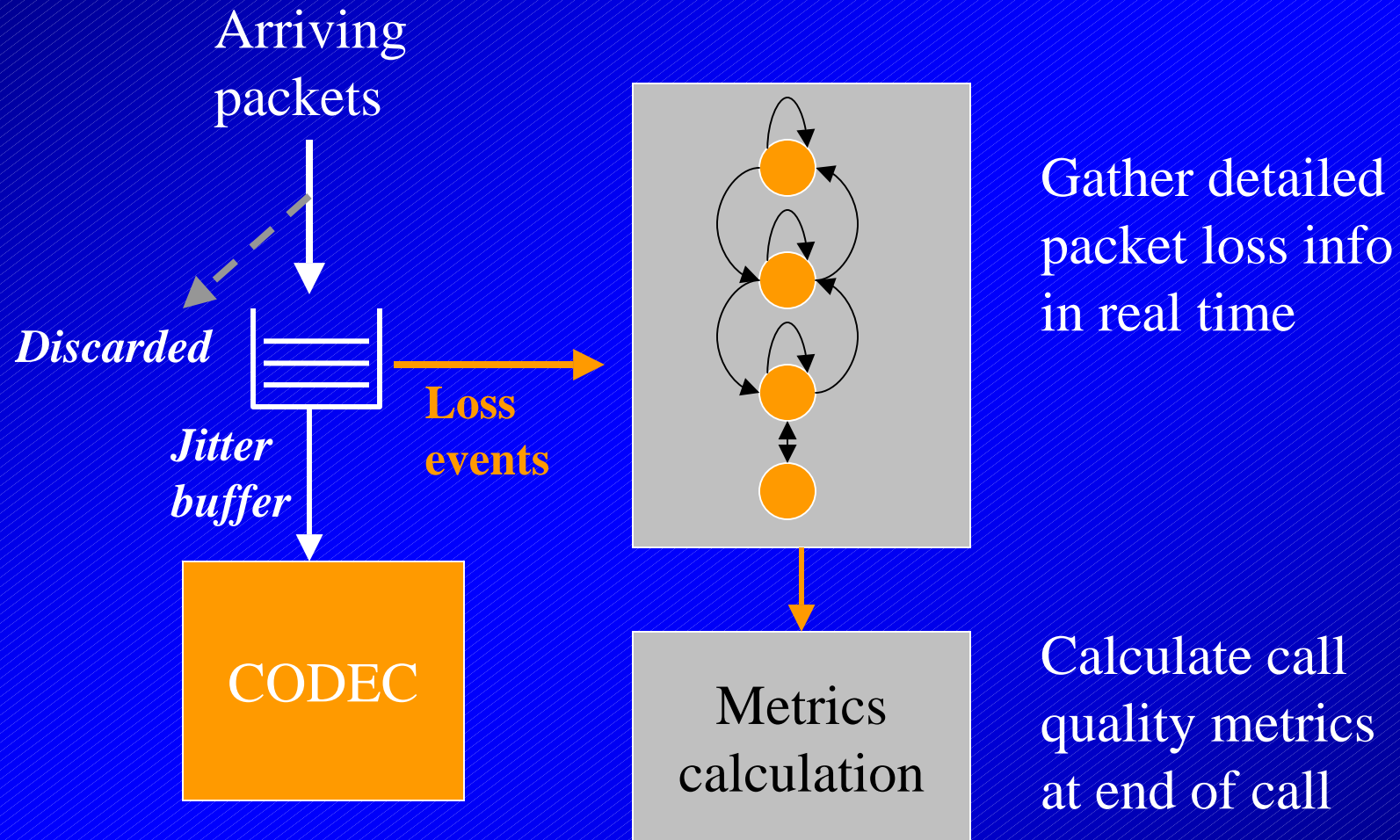


Source AT&T  
TIA1.7/98-031

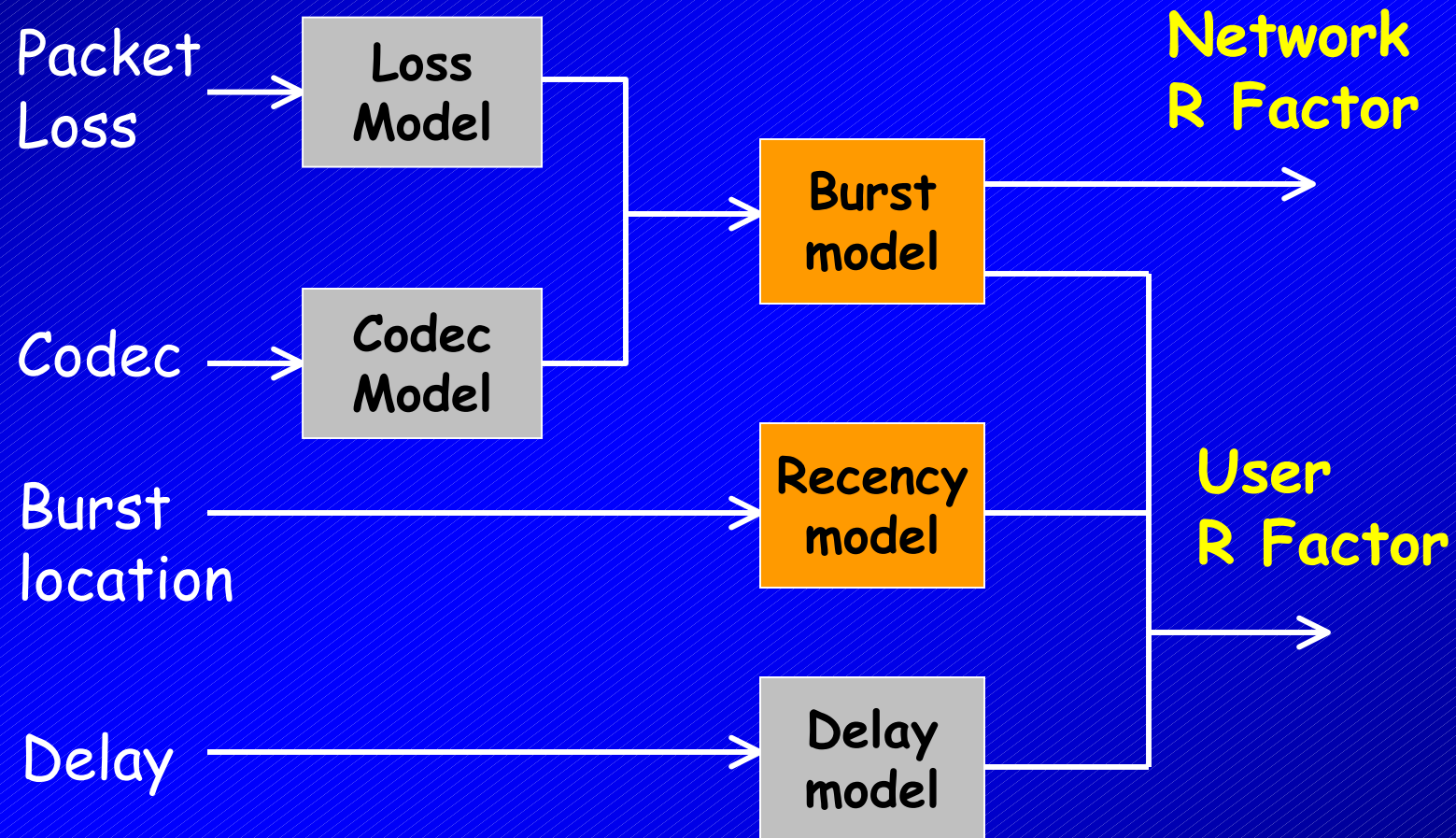
# Monitoring User Experience



# How VQmon works



# Extended E Model

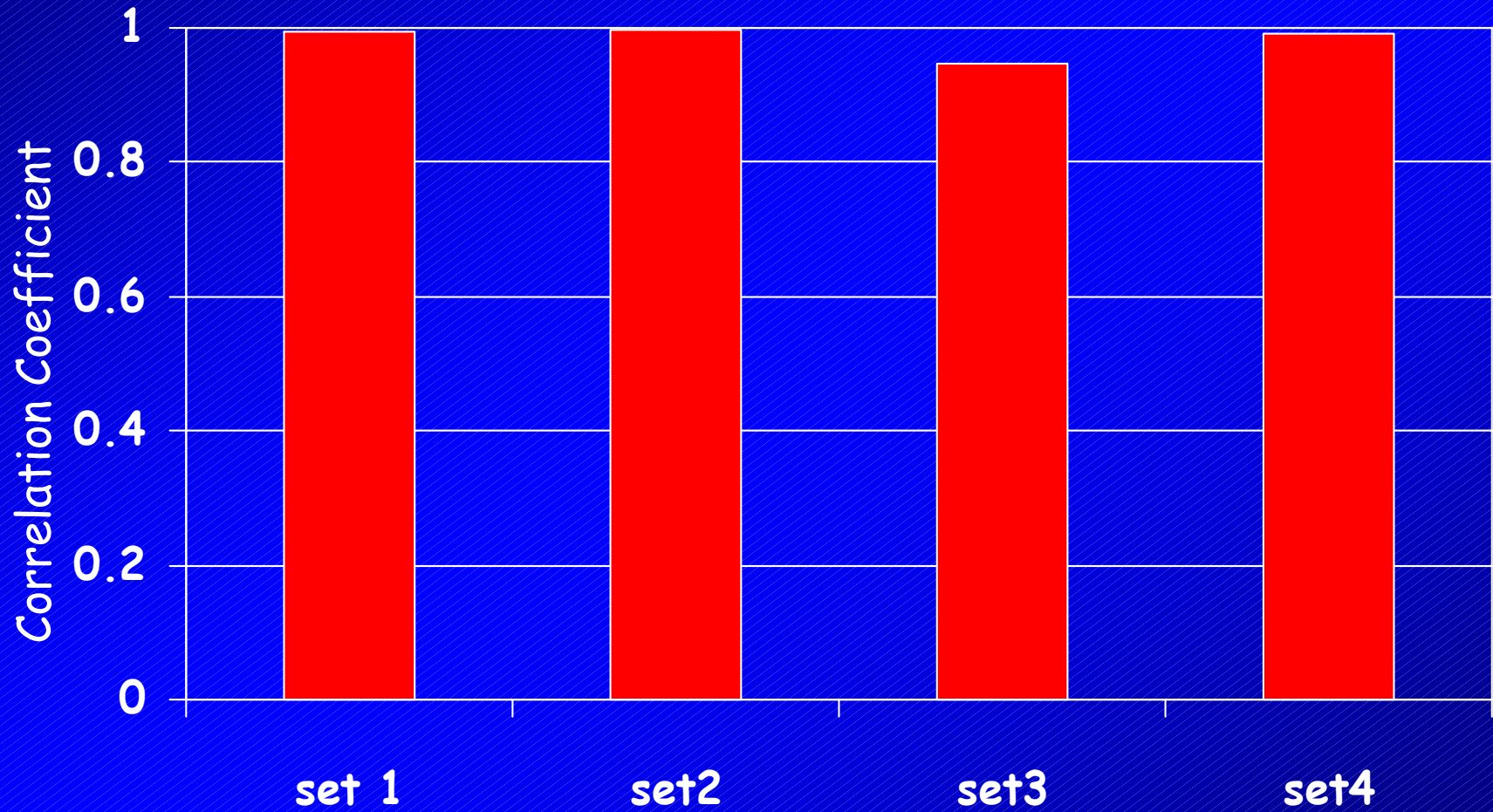


■ ITU E Model

# Extracting Metrics



# Accuracy?



# Lightweight Operation

## Stream monitor

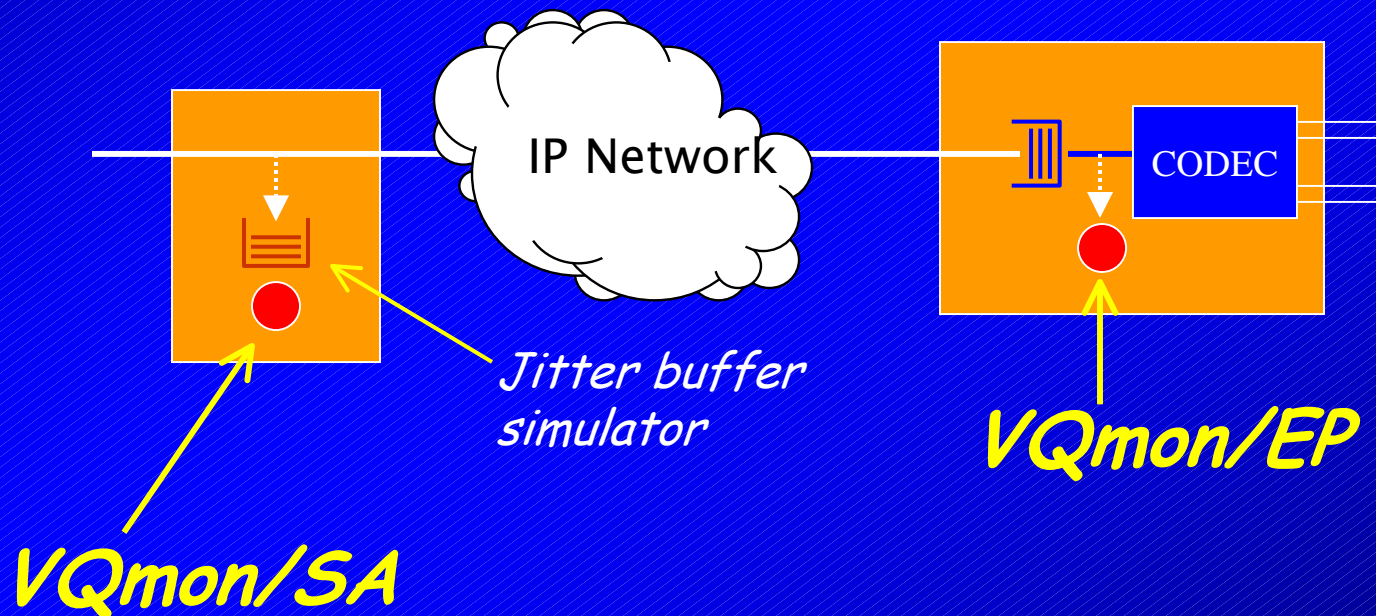
0.0075 MIPS

*(50,000 instances on PII/400)*

## Port monitor

0.000075 MIPS

*(5M instances on PII/400)*

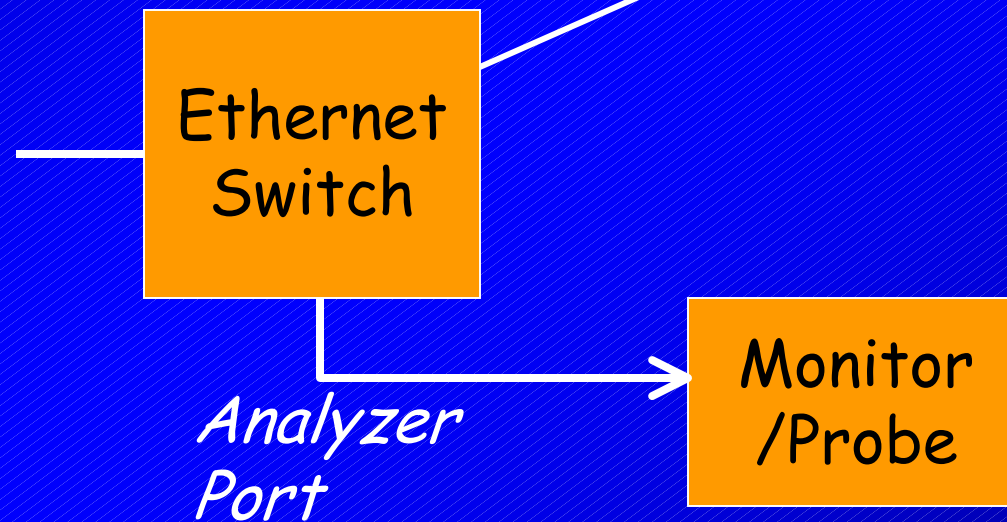


# Application - IP Phone

Troubleshoot at the  
User's desktop



IP Phone  
with VQmon



# About Telchemy

- **Focus** - *deliver end-user perceived QoS with minimum use of network resources*
- **Approach** - *open architecture, software based, integrate with any VoIP systems*
- **First products** - *lightweight call quality monitoring software for integration into VoIP Gateways, and SLA monitors.*